MOVING BEYOND THE CHALLENGES AND SEIZING THE OPPORTUNITIES: A STUDY OF SOUTH AFRICAN UNIVERSITIES' EFFORTS TO PROTECT THEIR RESEARCH AND INNOVATION OFFERINGS DURING THE COVID-19 PANDEMIC

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ABSTRACT

Like all organisations globally, South African universities were caught off-guard by the impact of the COVID-19 pandemic. To manage its financial and contractual/legal risks when faced with a threat such as a pandemic, an organisation needs integrated insight through the use of available information to assess possible disruptions and to be able to respond appropriately. This study analyses the status of South African universities in respect of their research and innovation offerings, and in particular the nature of their research contracts and their ability to respond to a threat such as COVID-19. Interviews were conducted with senior managers in seven South African universities. Some of the themes that emerged from these interviews were analysed using extracts from the financial management maturity model (FMMM) (Comptroller and Auditor General 2018). It was reassuring to find that the contractual risks can mostly be mitigated. However, the lack of strategic information and lower financial management maturity levels made it difficult for most universities to assess the financial impact of this pandemic and to respond appropriately.

Keywords: contractual risks, financial maturity, universities, research and innovation, South Africa, COVID-19

INTRODUCTION

Entering the year 2020, very few could predict that by mid-2020 around 90 countries would be in full or partial lockdown, characterised by closed borders, airports, educational institutions, and shops, with authorities calling on every person to stay home (Wikipedia 2020). Later some governments began slowly to ease their strict lockdown measures to stimulate their declining

economies. This easing was generally done with great caution, as the signs of a second wave of infections were already evident (Gallagher 2020).

At the time of submission of this article in August 2020, the novel Coronavirus (COVID-19) has reached a pandemic level seldom reached by other infectious outbreaks (LePlan 2020). Difficult decisions were made – and remain to be made – by governments, as any decision to prevent or limit a human catastrophe will lead to economic distress. This difficult decision trade-off is eloquently illustrated by South Africa's President Ramaphosa's address to the nation on 23 March 2020, announcing a national lockdown one week after declaring a national disaster due to the coronavirus pandemic: "While this measure will have a considerable impact on people's livelihoods, on the life of our society and our economy, the human cost of delaying this action would be far, far greater" (Covid-19 Online Resource and News Portal 2020b).

It has become clear that the coronavirus will do far more damage to the global economy than originally predicted. It seems that the chances of global recession (the worst since World War II) have risen dramatically, with a global growth rate of less than 2.5 per cent predicted (Frankel 2020).

It is difficult for any government or organisation to respond with *agility* and enough insight into the possible disruption caused by a threat such as COVID-19, where the impact on human lives, organisations, governments, and global economies is difficult to predict.

An unfortunate consequence of the pandemic is that many organisations that fund research activities at universities are also experiencing severe economic pressures. In April 2020, *Nature* published an assessment of how the major research funders globally are adapting their policies and regulations in response to the consequences of the COVID-19 pandemic. In summary, funders are all very lenient, issuing no-cost extensions for research projects and allowing maximum flexibility, within the existing budget, to cover costs such as staff salaries (even if those staff members cannot work during lockdown) by re-allocating funds from budget line-items that were underspent, and shifting them to where the greatest needs are. However, most funders will not provide additional funding to these projects during the extension periods. In general, funders are making substantial amounts available to fund COVID-19-related research, and are committed to ensuring that the grants' administrative and reporting processes will remain unaffected (Stoye 2020).

In South Africa, the impact of the national lockdown on certain industries has been substantial. For example, the wine industry was hit hard by the national ban on alcohol sales during lockdown levels 4–5, and partially under level 3.[1] These restrictions had a direct impact on the wine industry's funding for research at universities and resulted in project budget cuts.

To be able to manage its financial and contractual/legal risks with *agility* when faced with

a threat such as a pandemic, an organisation must have the capability of an integrated insight, based on accurate information and established management practices, to assess possible disruptions and to plan accordingly. This raises the question: How well will universities respond to a threat such as the COVID-19 pandemic when neither the timelines nor its impact on the economy can be predicted?

Universities are under pressure to continue with their academic offerings to students via online teaching. Simultaneously, the importance of limiting the financial and contractual risks when they are unable to deliver on the research contracts – which are an extremely important form of income, contributing more than R13 billion towards universities' research and innovation activities in 2017/18 (DST 2019, 5) – should not be underestimated.

As experienced globally, insurance claims are not fully – or even remotely sufficiently – covered by business interruption policies for all direct and indirect losses. In general, the insurers' viewpoint is that the national lockdown is not covered by business interruption policies, as these only cover business interruption claims arising from physical damage to property that has been caused by a specific event (defined in the policies as events such as fire / flood damage) and there are no references made to infectious diseases or pandemics (Buthelezi 2020).

Against this background, this study explores the dilemma that South African universities face in responding with *agility* in order to protect their research contract offering during a time of uncertainty caused by a threat such as the COVID-19 pandemic.

AIM OF THE STUDY

This article aims to assess the current response of South African universities while facing the potentially negative impact of the COVID-19 pandemic on the research offering in the short- and longer-term. It also attempts to identify opportunities to address areas of weaknesses and to build on current core strengths.

This ability would not only assist an organisation to be *resilient* in times of difficulty, but – if grasped with both hands – it would also allow an organisation to move towards *antifragility*. Nassim Taleb defined "resilient" to mean "resists shocks and stays the same" while "the antifragile gets better" (Taleb n.d.). Kennon, Schutte, and Lutters (2015) seek to build a framework to measure *antifragility* in a complex system. To assess complex systems, and to recommend system improvement as a response to "shocks" or volatile changes (such as the impact of COVID-19 pandemic on organisations), it is important to understand the dynamic environment and the different stressors (whether internal or external) that have an impact on the responsiveness or adaptiveness of an organisation. In the context of this article, some of the

findings of Kennon et al. helped to determine the study's approach.

To be *adaptive* can have different meanings in the *antifragility* measurement framework – for example, "(1) the ability to (autonomously) respond to or anticipate consequences of particular actions in a deterministic and structured manner; and (2) by not just being responsive to environment dynamics, but self-organising, evolutionary or natural selection type behaviours like those of biological systems" (Kennon et al. 2015, 178). It is argued that the absence of a measurement framework to assess the *antifragility* levels limits an organisation's ability to make systems less fragile; and that, to understand the antifragility levels, aspects such as organisational structure, governance, policies, strategies and mandates, and systems and processes must be assessed and contextualised. An important point is to be able to understand the "why" and "what if" behind certain pockets of information (Kennon et al. 2015).

As part of this study, some aspects of the financial management maturity model (FMMM) were considered and applied to provide further insight into potential opportunities or threats (and answer some of the "why" and "what if" questions), and give direction to responding with *agility* – exactly what is needed during a threat such as the COVID-19 pandemic (Comptroller and Auditor General 2018).

METHODOLOGY AND ANALYSIS

Figure 1 summarises the research methodology that was followed for the purpose of this article.

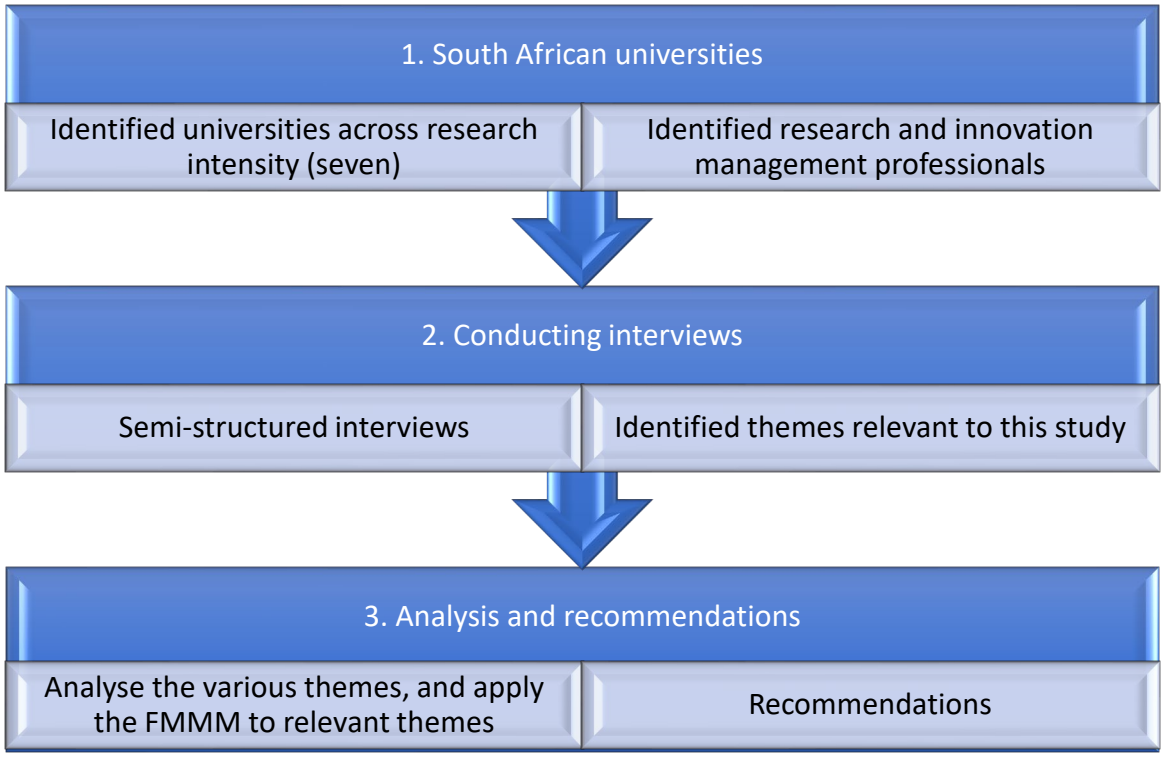


Figure 1: Research methodology

South African universities

From the 24 universities represented in the South African National Survey of Research and Experimental Development 2017/18, interviews were conducted with senior managers in research and/or innovation management at seven universities, representing different clusters of research intensity, to ensure that the study was not biased towards a certain type of university. Based on this survey (DST 2019, 82), the research and development (R&D) expenditure per university and the full-time equivalent (FTE) per researcher were plotted against the per capita research publication output, in line with the Report on the Evaluation of the 2018 Universities' Research Output (DHET 2019, 35). In the graph in Figure 2, the Y-axis represents the per capita research publication output (DHET 2019, 35), the X-axis represents the researcher FTE (DST 2019, 82), and the size of the bubble on the graph represents the R&D expenditure per university (DST 2019, 82). The universities in the top right quadrant are the most prominent or the highest research-intensive universities, and those in the left bottom quadrant are the least research-intensive universities, based on the chosen criteria. The universities that participated in this study were spread across the range of universities represented in the graph. This was to ensure that a broad perspective, across all levels of research intensity, was presented in order to make the selected sample as representative of the population as possible. The participating universities will be referred to as "University 1 ... 7" to ensure their anonymity.

Conducting interviews

Semi-structured interviews were conducted with research- and innovation-management professionals (senior managers) at the seven participating universities who understand the context of the regulatory and strategic framework of conducting research and innovation activities at universities. The broader themes of these interviews related to governance, risk management, and compliance in the context of research contract management in a university. The following topics were covered (with sample questions provided):

Organisational structure

The purpose was to establish whether the organisational structure, management practices, and mandates for research contract management were "fit for purpose".[2] Sample questions:

- Describe how the research contracts function is structured.
- What would you describe as the benefits and the challenges of the current structure/s?

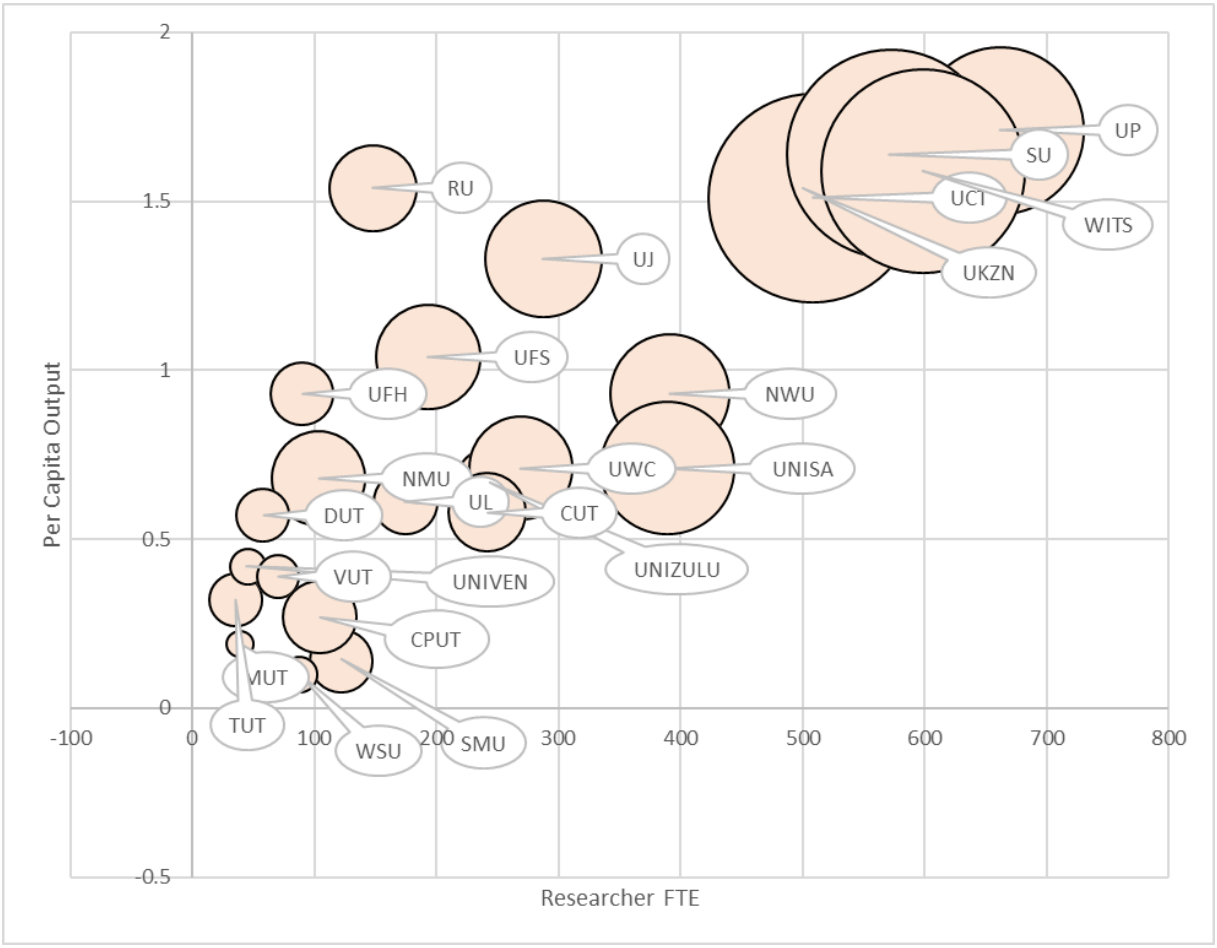


Figure 2: Research intensity, based on per capita publication outputs vs researcher FTE vs R&D expenditure (2017/18)

Research contract information

The purpose was to establish whether the available information and the systems that were being used could support the university in accessing accurate information for monitoring, management, and reporting purposes. Sample questions:

- What type of information do you capture for each contract?
- The reason for capturing this information is mostly for (a) monitoring, (b) management, or (c) reporting purposes, or (d) combined, or (e) other?

Monitoring and management function

The purpose was to establish whether the available information and the risk management practices could support the university in assessing and mitigating its contractual, legislative,

and financial risks. Sample questions:

- In your "research contract management" role in your institution, what would you consider the three to five biggest risks for your institution concerning research contract management?
- Do you have a standard approach to address / mitigate these risks? Do you consider the approach taken to address each of these risks as effective / efficient enough?
- Do you keep track of each contract's *contractual requirements* in terms of deliverable dates, fund spending, etc.?
- Do you have a *forex policy or strategy*?

Roles and responsibilities

The purpose was to establish where the roles and responsibilities are based in relation to compliance and risk management, and whether they are appropriately addressed by the responsible officials. Sample questions:

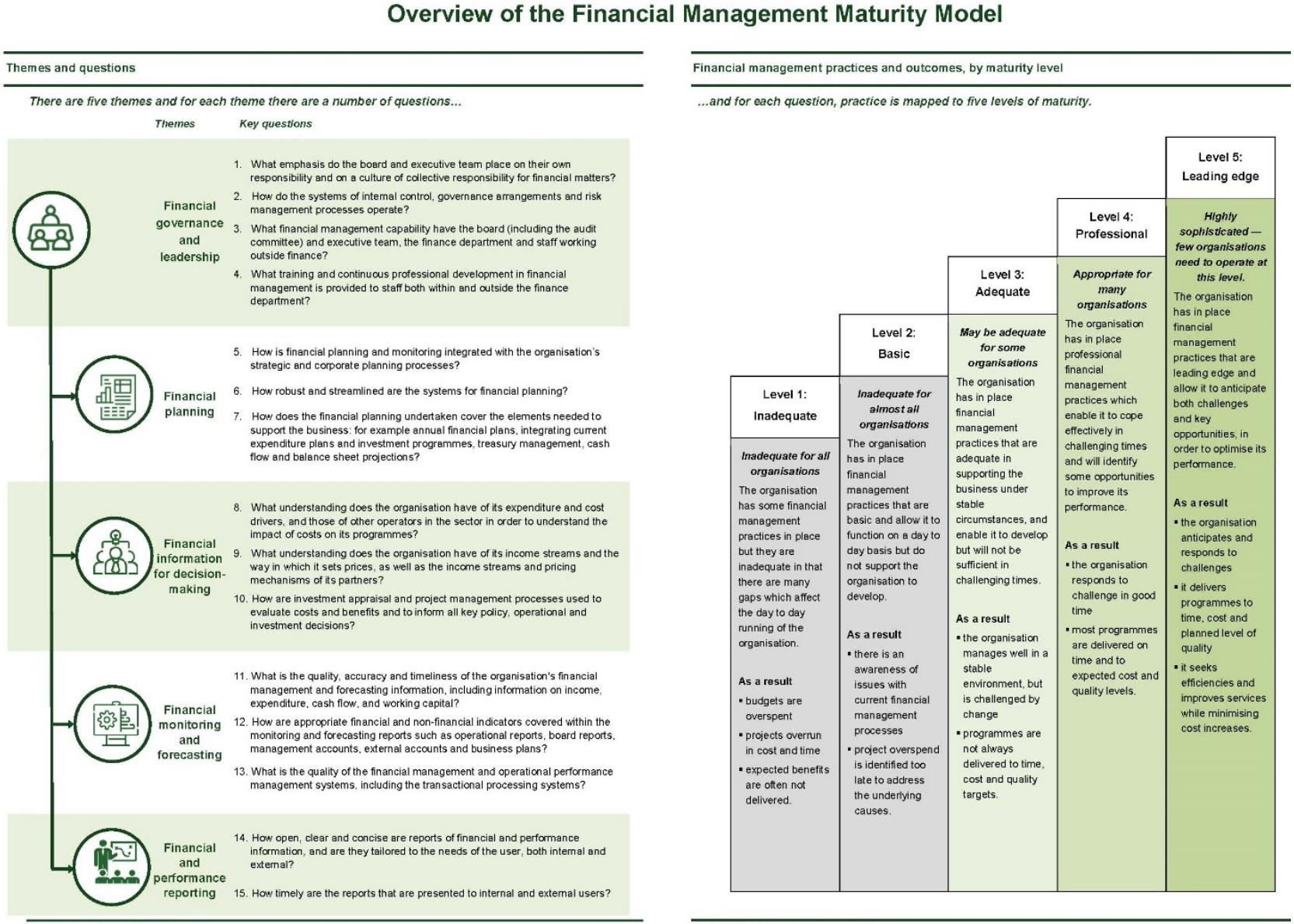
- In terms of the life cycle of a research contract, unpack the *roles and responsibilities* for compliance and risk management. What checks and controls are in place, and who is responsible for each? What challenges do you face in this regard?

Reporting and strategic decision-making

The purpose was to establish the governance and management practices and underlying support for the strategic decision-making capabilities needed to respond with agility when faced with a threat. Sample questions:

- How do you make use of the financial information on research contracts to assist in strategic decision-making?
- Do you distinguish between a full-cost budget and a contract price? Why, or why not?
- Are you able to do *accurate forecasting* on budget line items?
- Please describe the *strategic decision-making capabilities* that your organisation has in terms of research contract management information, and how would you like to improve / expand those capabilities?

Figure 3: Assessment of financial management practice (Comptroller and Auditor General 2018, 16,17)



		Practice	Awareness	Expected Outcome
Leading Edge	5	The organisation has in place financial management practices that are leading edge and allow it to anticipate both challenges and key opportunities, in order to optimise its performance.	The organisation places an emphasis on continually striving for excellence in financial management and seeks opportunities to improve which are inventive and might sometimes be radical.	The organisation anticipates and responds to the challenge of changing circumstances and looks ahead to anticipate significant events. It delivers programmes to time, cost and planned level of quality, with very few exceptions. It seeks efficiencies and improves the services it delivers while minimising potential increases in costs. There is a sophisticated understanding of the organisation's cost base in terms of understanding the key drivers of different services and products.
Professional	4	The organisation has in place professional financial management practices which enable it to cope effectively in challenging times and will identify some opportunities to improve its performance.	The organisation continually reviews its financial management processes and makes improvements to build upon and develop the current methods.	The organisation responds to challenge in good time and looks ahead to anticipate most significant impacts. Most programmes are delivered to time, cost and planned level of quality. It understands the impact of change on the costs and performance of different programmes and is able to deliver cost efficiency programmes.
Adequate	3	The organisation has in place financial management practices that are adequate in supporting the business under stable circumstances, and enable it to develop but will not be sufficient in challenging times.	The organisation will try to improve financial management as a result of responding to the need for change as opposed to engaging in a continued drive for improvement. It may be shocked into significant change by crisis.	The organisation manages well when the environment is familiar and stable. It may be significantly challenged by unforeseen events, or by government administration changes or new initiatives. Programmes are not always delivered to time, cost and planned level of quality due to difficulties in anticipating and responding to risks in a timely manner. The organisation will achieve cost reduction through a combination of efficiency programmes and budget cutting.
Basic	2	The organisation has in place financial management practices that are basic and allow it to function on a day-to-day basis but do not support the organisation to develop.	The organisation has some awareness that it needs to improve its financial management but does not actively do so. Improvements are rarely made.	The organisation is aware of a number of issues with the current financial management processes, which have been highlighted by sources such as external and internal audit. It becomes aware of potential overspends too late to be able to bring them back into line. Some of the major projects are regularly over time and cost and are of less than expected quality. The organisation reacts to reductions in funding by budget cutting due to a lack of understanding of the impact of changes on the costs and performance of programmes.
Inadequate	1	The organisation has some financial management practices in place but they are inadequate in that there are many gaps which affect the day-to-day running of the organisation.	The organisation has little awareness of the need to improve financial management and makes very little effort to make changes.	The organisation receives funding and spends it with little awareness of how to drive improvements in efficiency or of the results it may obtain from the expenditure. Budgets are frequently over-spent with limited understanding of the causal factors and no remedial action planned. Projects frequently overrun on cost and time and the intended benefits (if they are defined) are often not delivered. It may have major project failures, and is at risk of suffering from fraud.

Analysis and recommendations

Different themes emerged from the responses in these interviews, and they were analysed to understand the broader context. To obtain broader insight into the complex systems of research contract management, aspects such as organisational structure, governance, policies, strategies and mandates, and systems and processes must be assessed and contextualised – as previously explained (Kennon et al. 2015). Themes that emerged that were related to the financial considerations in the time of a threat such as a pandemic were further analysed by considering and using some aspects of the financial management maturity model (FMMM), which "describes practices and awareness of financial management and relates them to the outcomes organisations might expect" (Comptroller and Auditor General 2018, 9). This model assists the user to assess their financial management maturity levels and identify areas for improvement. The ability to move beyond the prevailing immaturity levels (*fragility)* and to seize the opportunities created by understanding their weaknesses, and responding and reacting to those with *agility*, will rely on the maturity and sophisticated financial management practices that can only follow once an organisation gets the basics right.

The different maturity levels are assessed by asking 16 core questions that are based on five key aspects, as presented in Figure 3 above. Figure 4 above summarises the overall expected outcome per maturity level once the detailed analysis is complete. These figures only provide a broad overview, and it is recommended to refer to the detailed report when applying this model in an organisation to assess its maturity levels (Comptroller and Auditor General 2018).

EMPIRICAL RESULTS AND DISCUSSION: THEMES IDENTIFIED DURING THE INTERVIEWS

From the interviews, several common perspectives and themes emerged concerning the research and innovation offering of the participating universities. The most relevant themes identified from the interviews are summarised in Table 1.

The themes are listed in the first column in the table, and the university interviewee responses were then briefly summarized and categorised according to the research intensity of the university. The FMMM aspects in Figures 3 and 4, where a maturity level is assessed for each category, also appear as themes in the table. This is followed by a more detailed overview of the findings and discussion per theme. For this section the Universities are classified according to research-intensity as follow:

- *Universities 3, 4, and 6* are clearly distinguished as *high* research-intensive universities in

comparison with the others, based on the themes that emerged.

- *University 5* is clearly distinguished as a *medium* research-intensive university in comparison with *Universities 1 and 7*, based on the themes that emerged. *Universities 1 and 7* fall between the lower and medium research-intensive categories, based on the themes that emerged; and their maturity levels varies depending on the specific theme.
- *University 2* is clearly distinguished as a *lower* research-intensive university in comparison with *Universities 1 and 7*, based on the themes that emerged. *Universities 1 and 7* fall between the *lower and medium* research-intensive categories, based on the themes that emerged, and their maturity levels varies, depending on the specific theme.

Table 1: Summary of Interview findings, categorised by theme and by university research intensity

Theme (Discussion paragraph in brackets)	**University category**		
	High research-intensive	**Medium research-intensive**	**Lower-medium research-intensive**
Priority conflict:	*Teaching and learning:* Prioritized. *Research:* Prioritized simultaneously.	*Teaching and learning:* Prioritized. *Research:* No attention.	*Teaching and learning:* Prioritized (survival mode). *Research:* No attention.
Research contracts organisational "insight"[3]:	*Dedicated* research contracts' function. "Fit-for-purpose" *mandates*. More accurate *insight* into research contracts. Appropriate *risk management*. Established *policies* and practices.	*Dedicated* research contracts' function. "Fit-for-purpose" *mandate*. More accurate *insight* into research contracts. Appropriate *risk management*. Relevant *policies* and practices – not fully implemented.	*No dedicated* research contract function. No "fit-for-purpose" *mandates*. No *insight* into research contracts. Limited *risk management*. Working towards implementing relevant *policies* and practices.
Contractual aspects:	Funders understand delays. No-cost extensions. Unintended operational and financial implications.		
Financial management maturity (FMMM) level:	**Levels 3–4**	**Levels 2–3**	**Levels 1–2**
Costing and pricing principles:	Well established	Some applied	Very limited
Foreign exchange strategy:	Yes	Yes	No
Professional support in financial management and compliance:	Yes	Insufficient	None
Accurate forecasting based on research contracts:	No	No	No
Processes for collated strategic information in place:	Yes	Yes	No
Financial planning capabilities enriched with relevant operational information:	Yes	Yes	No

Priority conflict

According to Professor Laura Czerniewicz (2020), the "Higher Education sector in South Africa and globally was already in a fragile condition – some would say a crisis – before the COVID-19 pandemic and its associated campus shutdowns began". A general aversion to technology as the primary medium for teaching and learning is experienced. The contributing factor to this aversion is that technology is used as an emergency response. Few universities had the foresight to plan for such a situation, and the infrastructure and expertise are lacking to varying degrees. However, academics and students have demonstrated exceptional resilience, and are finding creative solutions to meeting the teaching and learning needs (Czerniewicz 2020). It is further argued that, even though there are different views and perspectives on the importance and complex nature of relationships between private companies and public universities in general, student learning is explicitly prioritised, even in the midst of deep disruptions such as those caused by Covid-19 (Czerniewicz et al. 2020).

Findings

This view was confirmed during the interviews and it became evident that all universities were faced with conflicting priorities where *teaching and learning* vs. *research* are concerned. However, the degree of priority conflict varied with the research-intensity of the universities.

❖ *Teaching and learning priority*

Although challenging, the high research-intensive universities, as well as some of the medium research-intensive universities (*University 5)* were ready to go online with teaching and learning. *University 5* mentioned that, because of #FeesMustFall[4] "we have learned several lessons about how to present academic offering online and do online exams. It was amazing how quick[ly] we could get our teaching platform ready to respond to Covid-19 ... However[,] data for students is problematic."

However, the lower-medium research-intensive universities experienced severe challenges in offering online teaching and learning.

❖ *Research priority*

From the interviews it was determined that only the high research-intensive universities managed to attend to the impact on research simultaneously, however not without challenges due to higher than normal demand for research contracts' services. All other participating universities confirmed that they have no capacity to attend to the impact on research simultaneously as is evident from the comment below:

> *University 1*: "They are too busy trying to get online courses, devices and data to all the students, and getting the university geared. I don't think anyone has even given a thought about ... the fact that our research is paralysed ...."

Discussion

Without doubt, all universities prioritised their teaching and learning capabilities and the result is that the medium-low research-intensive universities are moving into a survival mode which causes attention moving away from research as a priority. At the same time universities experienced a significant increase in demand for research contract services during the pandemic, which corresponds with experiences from research contract's offices from 19 universities in the United Kingdom (Association for Research Managers and Administrators 2020, 4–8). Universities will have to increase their efforts in planning on correcting the balance in priorities.

Research contracts organisational "insight": With reference to organisational structure, mandate, risks and policies

Findings

❖ *High research-intensive universities*

These *high research-intensive universities* understand the complexity of research contract management, and that specialised expertise is needed (usually a combination of legal, financial, scientific-business. and intellectual property knowledge). Well-established research contracts and technology transfer functions are evident (including the legal function), either via a *dedicated* research contracts office and technology transfer office (TTO) or a combination thereof, or by a wholly owned university company. Their research contracts and technology transfer functions were already well-established before the Intellectual Property Rights from Publicly Financed Research and Development (IPR Act) Act 51 of 2008 (RSA 2008) was promulgated. Over several decades their organisational structures and *mandates* changed to become more "fit for purpose" and to address weaknesses in their systems. Due to a centralised research contracts function, there is fairly good *insight* into all research contracts. This centralised function is responsible for overall reporting on research contracts, although gaps are identified relating to systems and processes that are not seamless or integrated. Several of these universities had a previous organisational structure through which research contracts were dealt with by the central legal services; and they confirm that there was a significant improvement in the value chain once the legal function was moved into the research contracts' office/function,

and that significant immediate and long-term benefits of this change were evident. These universities have implemented clear approval processes and *policies* with strong involvement from the faculties (both Heads of Departments and Deans), researchers, and financial accountants (whether centralised or faculty-based). Their research contract management makes provision for a clear *risk* management approach.

University 4 confirmed the importance of the correct placement of the legal function: "The researchers have responded positively to the move of the legal function into the research contracts office, as it contributed significantly to building trust between the research contracts office and researchers, and resulted in the research contracts office being viewed as part of the team. We have built up expertise over the years to review contracts within context and understand the underlying risks and can effectively assist with pro-active mitigation thereof."

University 6 also confirms the importance of having the legal function as part of the research contracts office, and adds that "lawyers are really good at removing risks, and as they remove the risks, all the opportunities goes with it .... You need to find the right balance between risk and opportunity. ... You need to understand the research process and have to deal with these complexities and have to get the balance right".

❖ *Medium research-intensive universities*

The medium research-intensive universities appreciate that a *dedicated* research contracts function with a "fit-for-purpose" *mandate* is indeed essential to ensure improved *insight* into research contracts and *risk* mitigation, research contract management, and improved strategic information for decision-making. One university (*University 5)* has a dedicated research contracts and technology transfer office that deals with the research contracts and commercialisation opportunities, and has legal, business, scientific, and financial expertise. In 2020 *University 7* changed its organisational structure to a centralised research contracts and technology transfer function. In their prior organisational structure, contracts were reviewed by an external law firm; and this reportedly posed major risks, as there was no insight into the research contracts offering. *Universities 5 and 7* reported several shortcomings in respect of integrated processes and accurate overview, but mostly these universities find ways to overcome those shortcomings via the representation of senior/top management, deans, research contracts / technology transfer, and finance on different committees to enable insight into related functions in the university. The original reason for establishing these committees was a lack of capacity in research contracts, and drawing in experts from different environments (finance, procurement, faculty management, ethics, research office, etc.). These universities are actively working towards implementing critical *policies* such as research contract management

and full cost and indirect cost recovery; however, it is still a work in progress. *University 7* will in future be able to identify with the medium research-intensive category due to their new strategy.

University 1 is dealt with in the lower research-intensive category on this theme, due to the lack of a dedicated research contracts function and fit-for-purpose mandate, which result in limited insight in contracts and risk mitigation and pleas for a central research contracts office with legal expertise to prioritise research contracts. It reported that its central legal services are responsible for the contract management function, but do not capture any of the information that is needed for appropriate research contract management, and also do not have the specialised expertise and knowledge to understand the context of the research contracts. It explains: "They are lawyers with no understanding of research and how research works – they are very good in terms of legal clauses, but not the context. They have a very simple database with very basic information – who the parties are and when was the actual sign off / effective date" ... "We (TTO) however keep our own system as we look at other things. We keep all communication. So, every time a contract goes through our office (for IPR Act purposes), we save all the communication ... any documents related to the contract – perhaps previous contracts that have a bearing."

❖ *Lower-Medium research-intensive universities*

The central legal services, or an external law firm, are responsible for the review and negotiations of the research contracts, and therefore this function is *not centralised* in the research contracts environment. The TTOs were established in response to the IPR Act, and are *mandated* only to verify whether the intellectual property clause is compliant with the IPR Act, and only when requested by the central legal services or an external law firm. Both these contract management models create serious unintended risks, as the central legal services or external law firm do not understand the full context and risks associated with research contracts. They found that the central legal services or external law firm do not have the full insight, context, and understanding of the complexity of different research projects, and cannot give input on research costing, deliverables, permits, ethical aspects, or IP transactions. A specialised understanding of research and relevant aspects of legislative, regulatory, and funder compliance is crucial to mitigating *risks* in the post-contractual phase. Their level of engagement with researchers is mostly very limited. Basic information is captured by the central legal services or external law firm, only for the purpose of the workflow for contract approval, and not to support contract management. An intense disconnect between different functions is experienced, and confirms a serious shortage of *insight* into research contracts. Appropriate

mandates that support environments that are best suited to assist in research contract management are lacking. These universities plead for a mandated research contracts office/function such as has been proven to optimise research contract management, as in the models that are evident in *Universities 3, 4, 5 and 6*. These universities are actively working to implement critical *policies* such as research contract management and full cost and indirect cost recovery; however, it is experienced as a very slow and difficult process and lags behind universities in the medium and high research-intensive categories.

University 7 has recently implemented strategies, mandates, and organisational restructuring, which will assist it in moving towards the medium research-intensive category in the future. It confirms that, in terms of research contract management, "... it has outsourced all its contract management responsibility to an external law form outside of the university ... all the elements associated [with] contract management were handed over to this external firm. ... We want to transition away from that model .... What we envision ... is that we will be in a better position, because we have a legal unit in-house, a finance unit in-house, a special projects' team in-house and technology transfer function in-house. ... Ensure contracts are better costed, risks are identified, assessed and properly mitigated."

University 2 mentions that, "in the absence of a mandate, the university doesn't create extra capacity for that [purpose]. No budget is provided for that function." "There are three different divisions ... working on the same level with different functions, with no coordination between them." It further explains that, before 2017, there "was not even cost recovery added to the budgets ... obviously under-recovering money, there was no understanding or concept of full costs pricing". It is planning to address these challenges.

Discussion

In a benchmark study with 30 participating universities from the United Kingdom and Australia, similar trends were identified in that universities with smaller research income tend not to have dedicated research contracts functions, whilst the universities with large research incomes have dedicated research contracts teams who can support the research contracts offering of the university more effectively (Research Consulting 2018, 5, 14).

To have proper insight into research contracts, a dedicated research contracts function with the needed expertise, is strongly recommended. This function must be equipped with a "fit-for-purpose" mandate. Policies and processes supporting this mandate and its support function must be implemented. Funding towards the gradual costing of a research contracts function must be viewed as a strategic investment, as the professional management of research funding is a reality to secure more research funding.

Contractual aspects

Findings

Universities 1, 3, and 4 attempted to estimate the impact of the national lockdown from a contractual liability perspective via surveys. The detail of these surveys ranged from reaching out to researchers and reminding them of whom to contact if they needed contractual extensions, up to very detailed surveys that determined the impact on salaries, bursaries, running costs, costs of extending the contracts, etc. Although most funders are very understanding about timeline extensions, very few are able to provide additional funding for extended periods (Stoye 2020). Therefore, universities are challenged, having insufficient available funds to finish the contract research as per the agreements. At the time of conducting the interviews, appropriate planning by the executive management of the research-intensive universities for the required financial assistance to researchers was still in progress. The lower to medium research-intensive universities indicated that there was no formal planning to assist researchers financially, but indicated that their risk should be rather low due to their smaller research contracts offering.

Universities with medical faculties face liability risks with pharmaceutical company-sponsored clinical trials. Clinical trials require that a number of patients are enrolled as per the contract. However, due to the National Disaster Management Act and subsequent regulations by Provincial health departments, most clinical trials were discontinued to make more healthcare facilities available for the treatment of COVID-19 patients. A further predicament for these universities is an ethical one, as the principal investigators are responsible for the duty of care for these patients.

Operational concerns arise, such as extending project deadlines within uncertain timeframes; the mobility of international students and personnel and access to specialised laboratories nationally and internationally remaining a challenge due to strict international travel bans. With international collaborations, time-scale differences in the progression of the COVID-19 in different countries create uncertainty. South Africa lags behind in first infections by several months, and is still to reach its peak, while other collaborating countries might already have entered the stage of “normalised” business. Managing expectations about delivering research outputs will be important.

Discussion

The main concern is the unintended financial consequences of the lockdown periods suffered

by most countries, where no or very limited research could continue. Although funders are in general very understanding, the financial burden falls mostly on universities to fund the shortfalls on the extended budget periods with internal reserves. Each university will have to evaluate their portfolio of research contracts and renegotiate the scope and budgets of these projects within their means. However, to do so, the needed insight in the contract portfolio is required.

Financial management maturity

Some aspects of the financial management maturity model (FMMM) (Comptroller and Auditor General 2018) that are applicable to this study are applied to understand the pandemic's financial impact on research contracts (Figures 3 and 4 refer). This article does not attempt to analyse the financial management maturity of universities in general, but focuses only on the financial management maturity levels of the research contracts they offer. In this context, perspectives from the interviews will be discussed and it is evident that there is again a clear distinction between the high research-intensive universities and the lower to medium research-intensive universities.

Findings

❖ *High research-intensive universities*

These universities have in common:

- Well-established *costing and pricing* principles.
- *Foreign exchange* strategy (60–75% of research income is from international sources).
- Professional *support* in financial management and compliance.
- No current ability to accurately *forecast* future income based on current research contracts or per budget line item, although the need for that is expressed. Limitations in financial systems hinder forecasting. *University 4* actively works towards forecasting capabilities, specifically to enable accurate strategic management information. *University 6* mentions that "... the frustrating part is that, although we have the business processes mapped out and ready to go, our [financial system software] licence ... expires in two years ... not cost-effective ...".
- *Several divisions* work with different sources of information that are important for *strategic* purposes. Although systems are not integrated, processes for *collated*

information are in place. Some complex reporting is manually intensive; relevant experts are involved to ensure appropriate interpretation and accuracy of data. However, during the *COVID-19 pandemic*, information was not easily available in a single source or system. To understand the *financial impact*, they had to implement different strategies to obtain information via surveys.

- Evident increased accuracy and timelines in *financial planning capabilities*. Some automation of processes and workflows. The core function for reporting and planning rests with Finance, but is *enriched with relevant operational information* which leads to more accurate, actionable, and driver-based information. Information consumption is available through self-service analytics; however, it differs in the richness of data. *University 3* mentions that, "with captured information we can pick up several trends such as where our funding is coming from; that our funds from industry declined over the past 5 years; 60–70% of our income is from international funders; around 80% of the research funds comes from 20% of our researchers". *University 6* explains that financial services is "the central point, they interact with lots of people across the university and gathering data ... and synthesize it" and "we will provide contextual information .... They want to verify the information through an internal audit."

Conclusion: Maturity falls between Levels 3 and 4

The limited capabilities from a systems and process perspective does not allow these universities to develop appropriate driver-based forecasting models, and adds limited strategic value to decision-making capabilities. These universities employed different levels of operational and other information, to provide a more holistic understanding of the research contract offering.

❖ *Medium research-intensive universities:*

Only University 5 is regarded as medium research-intensive in terms of the FMMM and has:

- Some *costing and pricing* principles applied, but not well-established. Proper budgeting is only done for 10 per cent of research contracts, where full cost is a statutory requirement (IPR Act).
- International funding is in the minority, but implement strategies to mitigate *exchange rate* risks.
- Insufficient financial management *support* for researchers, although the need has been

acknowledged.

- No current ability to accurately *forecast* future income based on current research contracts. Confirmed definite need for forecasting capabilities. Limitations in financial systems hinder forecasting and implementation of indirect cost recovery principles are prioritized above forecasting capabilities.
- *Several divisions* work with different sources of information that are important for *strategic* purposes. Although systems are not integrated, processes for *collated information* are in place. Some complex reporting is manually intensive; relevant experts are involved to ensure appropriate interpretation and accuracy of data. *University 5* confirmed: "We don't have a plan of action to assess the *financial impact* due to *COVID-19"* and rely on researchers to approach the research contracts office for assistance.
- Evident increased accuracy and timelines in *financial planning capabilities*. Some automation of processes and workflows exist. Core function for reporting and planning rests with Finance, but *enriched with relevant operational information* which leads to more accurate, actionable, and driver-based information. Information consumption available through self-service analytics; however, it differs in the richness of data. Unfortunately, without well-established costing and pricing principles, limited operational information is available.

Conclusion: Maturity falls between Levels 2 and 3

The limited capabilities from a data, systems, and process perspective allow these universities to do only high-level rolling forecasts, and add no or very limited strategic value to decision-making capabilities.

University 5 employed some levels of operational and other information to provide a more holistic understanding of the research contract offering. Information is used for relationship management with potential funders, to identify growth opportunities, to encourage inter-disciplinary research opportunities, and to find new sources for funding of bursaries.

❖ *Lower-Medium research-intensive universities*

With regard to the lower to medium research-intensive universities, *University 7* stands apart from the others, as the strategy that it is currently implementing will raise their FMMM levels in the future. *University 1* moves to the lower research-intensive category due to lack of insight. These universities all have:

- Very limited *costing and pricing* principles applied. Proper budgeting is only done for 5–10 per cent of research contracts where full cost is a statutory requirement (IPR Act).
- They have no insight into research contracts, funding sources or how large the national vs international research contracts offering is. *University 1* explains: "We have no insight in[to] how big the national vs international funding and risk exposure is. That is one of the problems – we don't capture any of the budget or financial information. So, we do not know."
- *Exchange rate* risks are estimated as low, due to an assumed smaller international funding component.
- There is no financial management *support* for researchers and non-compliance with funders' financial requirements were raised as major risks.
- No ability to *forecast* future income based on current research contracts; and, although the need is acknowledged it is not a current priority. The current priority is implementation of full cost and indirect cost recovery principles and policies.
- They experience a lack of collaboration between *several divisions* working with different sources of information that is important for *strategic* purposes. *Data* interpretation is not always trusted as accurate. Very limited data is available on research contracts, although attempts are made to improve. *University 1* mentions that "Information is scattered all over ... We don't have a streamlined process for reporting to all these different organisations. Very fragmented."
- Very low-level *financial planning and capabilities* are evident and are mostly based on MS Excel spreadsheets and done manually. The only "accurate" information is available from the Finance Division, and is only finance-focused, with a very low level of analysis of data. No *operational information* to enrich the context is available. As the contract management is done through the central legal services or an external law firm, information is not captured for the purpose of informing strategic decision-making, and there is no accurate insight into the research contract offering. They could also not estimate the *financial impact* of the *pandemic.*

Conclusion: Maturity falls between Levels 1 and 2

No performance reporting on research contracts is possible, as no accurate operational information is available to inform a greater understanding and interpretation of the financial information. These universities' maturity levels for forecasting and modelling capabilities are non-existent or very limited, and they do not add any value to inform strategic decision-making.

Discussion

From the above it is evident that this pandemic place a microscopic view on universities' abilities to assess the financial impact of any threat placed on its research offering. Although there are no quick solutions to these challenges, it will benefit universities to assess their position in terms of their financial management maturity levels and to engage with those universities who are already more mature in their approach and learn from their experiences.

RESPONDING WITH AGILITY AND CREATING OPPORTUNITIES DURING A PANDEMIC

Universities in South Africa have responded with agility not only to find ways to continue with their educational functions, but also finding solutions to combat the health impact of COVID-19. To be in a position to respond with agility, internal systems and processes have to be responsive in terms of expedited outcomes. As an example, most of these universities have ensured that ethical reviews and contractual aspects of projects related to Covid-19 will be expedited and prioritised.

Universities South Africa (USAf) has published reports to showcase some of the applied research that addresses the pandemic, which demonstrates the universities' ability to exploit opportunities with agility (USAf 2020). A few examples include the following:

Universities with the capacity to manufacture sanitisers, personal protection equipment, and ventilators/respirators have immediately kick-started their efforts. Researchers participate in national and international forums, advising governments and other policy-makers on the epidemiological models. Opinion pieces have been published, raising awareness or informing society about challenges and precautionary measures, or discussing the ethical challenges faced by medical practitioners when choosing which patient should be given the opportunity for life-saving procedures when only a limited number of ventilators are available.

Several clinical trials for vaccines and diagnostic tests and related aspects were initiated; and immunological and other related studies, and the successful isolation of the novel coronavirus, are other examples of contributions made by the research conducted by universities for the public good. Mental health research is also prioritised. Frontline work by actively working in clinics and public and field hospitals, or assisting with screening, testing, and contact tracing are also common among university communities (academics and students).

CONCLUSION AND RECOMMENDATIONS

From the findings based on the interviews and informed by the financial management maturity

model, it is concluded that, with appropriate "fit-for-purpose" mandates for research contract management, and supported by specialised professionals (with legal, financial, scientific, business, and intellectual property knowledge expertise), universities are in a position to manage and support their research offering far better and with more agility than universities that lack such mandates and professional support. Well-established policies and practices on contract management and costing and pricing principles are critical if a university is to move to the next level of maturity according to the financial management maturity model, as well as in the category of research-intensity. The integration or partnering of different operational functions in the university contributes significantly to enriched management information.

Executive management have to reconsider the mandates for research contracts as it is evident that in the lower-medium research-intensive universities the lack of a fit-for-purpose mandate is a critical factor in the inability to have sufficient insight in research contract management. Universities in the high research-intensive category have a wealth of knowledge and experience on experimenting with different research contracts models in finding a suitable model and are willing to share that knowledge with others faced with these challenges.

Funders in general are very supportive in understanding that the pandemic will have short- and longer-term implications for the research; and contractual liabilities can be managed fairly well by proper communication between funders and universities. However, due to the lack of additional funding in general, universities will have to find ways to support research projects. It is, however, difficult for most universities to have a clear understanding of what the financial impact will be, due to the lack of insight into their research contract offerings.

Universities have the opportunity to learn from this experience and to respond in the short to longer term with new strategies to improve on those areas that are highlighted as problematic.

NOTES

1. The South African government decided on a risk-adjustment strategy to attempt to balance the impact of COVID-19 on the health sector with that on the economy by announcing different levels of lockdown. Under level 5, only essential services were operational, and strict curfews on citizens' movements were implemented. Level 1 would re-open all sectors in South Africa, with the fewest restrictions on movement, but with continued social distancing and other preventative measures (Covid-19 Online Resource and News Portal 2020a).
2. "Fit-for-purpose" mandate means that the mandate is developed and implemented to support the designated purpose or function.
3. "Insight" means to have records and knowledge of all research contracts in the university, have appropriate contractual and financial arrangements in place, understand and mitigate the associated risks, and have knowledge of the opportunities created by the research contract offering.
4. #FeesMustFall: A student-led protest movement (started in 2015) with the aim to stop increased university student fees, and requesting increased government funding for universities. This

resulted in no tuition fee increases for 2016. The protests were re-introduced when the Minister of Higher Education and Training gave universities the freedom to decide on their tuition fees, but capped any increase at 8 per cent for 2017. The cost of damage to universities' property was estimated at R600 million (Wikipedia n.d.).

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